Ethnoveterinary practices among women of Banaskantha district, Gujarat

Neeta Khandelwal
ASPEE College of Home Science, SDAU, S K Nagar-385 506, Gujarat
E-mail: neeta.udr@gmail.com

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A survey was conducted for documenting indigenous knowledge used by rural women for animal healthcare in and around Dantiwada taluka of Banaskantha district, Gujarat. Interviews of 200 rural women revealed that an inventory of 43 local practices was used for treating 10 ailments like diarrhea, cold, fever, foot & mouth disease, indigestion, etc., in domestic animals. Different plant parts (i.e., leaves, bark, roots, etc.) and products (i.e., fruits, condiments, spices, etc.), available locally or easily accessible in close vicinity have been used for medicinal purpose. Twenty veterinarian experts on ethnoveterinary practices were engaged for scientific assessment of documented practices. According to experts, a total of 30 practices adopted by locals could be considered useful as it followed scientific basis, however rest 13 were not recommended due to lack of scientific rationale. This and similar studies documenting indigenous knowledge of remedy for animal ailments, may prove helpful in carrying out further scientific research and can lead to popularization of cheaper and more effective ethnoveterinary practices.

Keywords: Ethnoveterinary, Indigenous practices, Women, Gujarat

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Animal husbandry, dairying and livestock rearing have been integral part of Indian agriculture and have traditionally served as a prodigious mean of employment generation in the rural areas, particularly among the landless, small, marginal farmers and women. Around 70 million Indian farmers manage about 485 million livestock\(^1\), which produced about 146 million ton of milk in the year 2014-15\(^2\). India is world’s highest milk producing country and recorded a growth rate of over 6 %. Recently, livestock sector is gaining more importance due to decreasing rural land holdings, financial stress due to increased cost of farming, frequent droughts and popularization of organic farming. Between 1983 and 2004, the share of animal products in total food expenditure increased from 21.8 % to 25.0 % in urban areas and from 16.1 % to 21.4 % in rural areas\(^3\). Despite green and white revolution, total productivity, investment and technology in agriculture and allied sectors remain inadequate. Indian animals yield 20-60 % less milk and meat than the global average\(^2\) because of constraints related to feeding, breeding, health and management. Frequent outbreaks of diseases like foot & mouth disease (FMD), black quarter (BQ), peste des petits ruminants (PPR), Brucellosis, Swine fever and Avian Influenza, etc., continue to reduce productivity and production\(^4\). However, the support of veterinary infrastructure (polyclinics, dispensaries, hospitals and diagnostic labs) and trained manpower is not adequate. Most of veterinary and animal health services come under public sector domain thus remain in poor state. Situation is more or less similar across the world as modern veterinary care reaches to only 20 % of livestock owners of the world and approximately Rs 50 billion are lost annually on account of livestock diseases in India\(^1\).

After independence, central and state governments focused entirely on creating an allopathic-based modern veterinary infrastructure and in this race traditional medicinal systems were entirely neglected or ignored by terming non-scientific. However, due to factors related to allopathic medicines such as cost, unavailability, inaccessibility to rural community, etc., indigenous medicine remained popular among rural communities. Since last few decades, scientists across the national and international arena are engaged to document and validate various indigenous practices and the study of ethnoveterinary aspects has become a growing area of inter-disciplinary research. Jain & Srivastava\(^5\) listed ethnoveterinary plants of India and
subsequently published status and prospects of plants in Indian ethnoveterinary medicine. Joshi & Nishteswar subsequently published status and prospects of plants in Indian ethnoveterinary medicine. Joshi & Nishteswar reviewed the ethnoveterinary practices followed in Barda hills of Gujarat and enumerated 122 species of medicinal plants used for treating sick animals.

**Objective**

Continuing the efforts to record and preserve the traditional knowledge, the objective of this study is to provide details of popular ethnoveterinary practices followed in rural areas of Banaskantha district of Gujarat and also to examine the scientific applicability of these practices. Women’s participation in livestock sector is as high as 90%; however very few studies have recorded the role played by women in treating cattle. Therefore, in this study women were taken as prime respondent.

**Methodology**

Usually there is little written text for indigenous practices and skills and knowledge gained through experiences are normally passed from one generation to another by verbal communication. Therefore, identifying the right approach is always a major concern. To overcome this issue semi-structured questionnaire were prepared and personal/ group interview technique was employed to document traditional ethnoveterinary knowledge of rural women in Banaskantha district of Gujarat state. In order to prepare semi-structured questionnaire, a preliminary survey was conducted. The firsthand information was collected through local people, traditional healers, livestock owner and experienced elder persons by means of group interaction, informal talk and exploratory walk following transect walk method of participatory rural appraisal. The practices cited by thus selected locals were verified with the help of local veterinarians who have practical knowledge of prevalent ethnoveterinary practices. After this exercise a total of 10 common ailments were identified and followed for formulating a semi-structured questionnaire.

Five villages namely: Gangudara (24°26’N & 72°21’E), Odhava (23°53’N & 72°2’E), Danghiya (24°15’N & 72°19’E), Sikariya (24°19’N & 72°17’E) and Vaghrol (24°17’N & 72°20’E) located in and around Dantiwada taluka (Fig. 1) were selected, after looking into broad socio-economic setup and involvement in dairy activities. It was found that in the study area women mostly took care of livestock. Therefore, women handling large number of cattle, were selected as respondents. Prior informed consent (PIC) of some experienced women and traditional healers from the study areas was taken, which include Maniben Haribhai Desai (65 yrs), Jamanaben Mafabhai Mesra (42 yrs) both from Vaghrol; Meenaben Joshi (32 yrs), Maniben Prajapati (52 yrs) both from Dangiy; and Rupaben Rabari (30 yrs), Siteben Piraji (45 yrs) both from Sikariya. A total of 200 rural women (40 from each village) were interviewed by using questionnaire to record their knowledge of indigenous practices about medicine preparation, dosages, method of administration and uses against ten specific ailments.

To determine the applicability of ethnoveterinary practices, data collected during survey was subjected to scientific assessment with the help of 20 veterinary experts. Scientific relevance of the indigenous medicinal practices was assessed on three-point continuum of ‘Relevant’, ‘Partially Relevant’, ‘Irrelevant’ with score 2, 1 & 0, respectively. Based on this assessment, scientific relevance score (P) for i-th practice was estimated as:

\[
P_i = \sum_{i=1}^{N} \frac{X_i}{2}
\]

Where, N = Number of respondents; \(X_i = 2\) if i-th practice is relevant; 1 if i-th practice is relevant; 0 if i-th practice is irrelevant.

The practices having high scientific relevance score (say more than 0.5) were considered scientific.

**Results**

It was found that locals are frequently making use of various locally available plant produce to treat sick
domestic animals and most of these practices are being used since ancient times. In order to treat ten most common ailments, 43 different methods (Table 1) are practiced by rural women in the study area. Table 1 also includes botanical name with family, local names, preparation and mode of application of medicines. Practices which were considered effective or useful are marked with an asterisk (*) at the start of titles. Table 1, also lists number of participants responded to specific practices, experts' opinion on three point continuum, relevant references and information.

Discussion

Following section includes discussion on various ethnoveterinary practices used by village women to treat 10 different common diseases, methodology, duration and materials used for treatment. To prepare a formula use of produce/parts from more than one plant/source is common. The common method of preparing formulae included grinding, boiling, crushing or soaking of various plant produces or parts. Plant-derived materials were dominating constituent in making traditional medicine followed by other materials.

Regarding the frequency of different veterinary diseases; removal of external parasites, diarrhea and indigestion were treated preferably with 6 different formulations, followed by cold and FMD each treated with 5 different formulations. Fever and skin diseases treated with 4 different formulations & tympany was treated with 3 different applications. While rest of two ailments, i.e., removal of internal parasite and constipation treated by two indigenous preparations. With regard to respondent’s responses towards animal ailments in study area, out of 200 respondents, 97 % rural women possess traditional knowledge to cure tympany and removal of external parasite, followed by removal of internal parasite (91 %). Indigenous practices preferred by 85 % respondents for treating indigestion and constipation. About 80 % of respondents applied traditional methods to treat fever and FMD disease. For treating cold and diarrhea about 74 % & 72 % rural women used traditional remedies, respectively. While, 67 % respondents were treating skin diseases through indigenous methods.

Total 23 plant species belonging to 17 families of Angiosperm and 1 family of Gymnosperms were used by villagers. At least 5 plant-derived materials were from Apiaceae family, followed by 2 from Fabaceae. Rest of the species have contributed one plant each. Out of reported 23 plants, 11 species were herbs followed by 8 species of trees, 3 shrubs and one grass. Hence, the herbs constitute the primary source of medicinal plant in terms of number of species (47 %), as these are easily available and convenient to use. Indigestion, diarrhea and removal of external parasite are being treated by 6 formulas each, however includes applications of 9, 6 & 3 plant species, respectively. Whereas, to prepare four formulas for skin disease and fever 7 & 2 plant species were used, respectively. Similarly, to prepare three formulae for tympany 5 plant species; whereas five formula for treating FMD and cold 4 & 3 plant species are required, respectively. Two formulas for removal of internal parasite and to cure constipation require each 3 plant species (Table 1).

Within 23 plant species, 13 species with most diversified uses are recorded in remedy of various diseases and disorders. Ricinus communis plant species was used for the treatment of five different diseases (constipation, removal of external parasite, removal of internal parasite, tympany and diarrhea). Produce of Brassica napus and Trachyspermum ammi were documented in four different types of ailments each including cold, skin diseases, removal of internal parasite, indigestion, fever, tympany and diarrhea. Azadirachta indica A. Juss., Linum usitatissimum, Saccharum officinarum and Curcuma longa were used for three different treatments; Ocimum tenuiflorum, Acacia nilotica Delile, Cocos nucifera, Aegle marmelos, Ferula asaefetida and Foeniculum vulgare Mill., were used for treating two different types of disease each (i.e. cold, diarrhea, fever, FMD, indigestion, skin diseases, removal of external parasite, removal of internal parasite and tympany).

Plant species namely; Annona squamosa, Curcuma longa, Brassica napus, Azadirachta indica A. Jess., Ferula asaefetida, Trachyspermum ammi Sprague, Trigonella foenumgraecum, Ficus religiosa, Cocos nucifera, Ricinus communis, Acacia nilotica, Linum usitatissimum, Pinus halepensis Mill. are reported to be used in many ethnoveterinary practices from various regions (Barda Hills, Porbandar, Sabarkantha & Dang district, Kachchh region and Bhiloda forest area of Gujarat state. Interestingly, out of these 13 plant species, methods of application of at least 6 plant species recorded from study are differ significantly. Leaves of Annona squamosa, reported earlier for killing worms, fast healing of cut & wounds, removal of external parasite, whereas in present study, Annona squamosa...
Table 1 — Indigenous practices adopted by women for treatment of animal ailments

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Indigenous practices</th>
<th>F Expert’s opinion (%)</th>
<th>Relevant reference/ information</th>
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<tbody>
<tr>
<td></td>
<td>Plant species with their family/local name/mode of administration</td>
<td>R</td>
<td>PR</td>
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**Cold (No. of response: 148)**

1. *Jaggery (Goud) decoction (kadha):*
   About 250 g of Goud (prepared from juice extract of *Seradi – Saccharum officinarum* L.; Poaceae) is boiled in 1 L of water & prepared decoction administered orally (2 × 1) till the cattle is cured.

2. Applying *Sarsav* (mustard) seed oil: Lukewarm seed oil of *Sarsav* (*Brassica napus* L.; Brassicaceae) is applied in nose & ear (2 × 1) for three days.

3. *Leaf juice of Tulsi (Basil):*
   Two handful leaf of *Tulsi* (*Ocimum tenuiflorum* L.; Lamiaceae) is boiled in one cup of water. Preparation is filtered and given orally (2 × 1) for 3 days.

4. Fuming with smoke of Jaggery (Goud): About 300 gm. Goud (prepared from *Saccharum officinarum* L.; Poaceae) burnt in fire and animal exposed to this fume for 15-20 min (2 × 1) till cured.

5. *Keeping animal warm:*
   Close shelter and blanket used to retain body heat for affected animals to protect against cold.

**Fever (No. of response: 159)**

6. *Giving cold water bath:*
   To keep body temperature low, cold water shower is given (1 × 1)

7. Covering with jute bag & giving smoke:
   Animals kept covered with jute sheet and exposed to fumes of dry leaf.

8. Decoction of *Baval (Babul)* leaf:
   The fresh two handfuls *Baval* (*Acacia Nilotica subsp. indiica* (Benth.) Brenan; Fabaceae) leaves are boiled in 1 L water till reduced to 1/4 volume and filtered. The decoction is administered (2 × 1) till cure.

9. Decoction of *Ajmo* (Carom) seed:
   Two handful seed of *Ajmo* (*Trachyspermum ammi* (L.) Sprague.; Apiaceae) are boiled in 1 L of water and given (2 × 1) till cure.

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This practice found to be useful as Jaggery has anti-cold properties & act as a cardiac tonic. Kanwar & Yadav: giving Jaggery decoction is an effective way of treating cold. Yadav et al.: villagers in Haryana prefer to give *Garlic (Allium sativum)*, *Cardamom (Elettaria cardamomum)*, mixture with Jaggery.

This practice was terms irrelevant as mustard oil is unctuous, bitter, pungent and increases congestion. Jadeja et al.: seed oil of *Sarsav* is given orally to cure cough.

Experts opinion that it is respiratory stimulant as presence of cinnamic acid improves breathing. Selvaraju et al.: giving *Tulsi* juice is a widespread practice among the Malyali tribes of Salem district.

Amitendu et al.: Farmers from West Midnapore, feed either extract of *Tulsi & Basak (Justicia adhatoda)* leaf boiled in water with honey or mix this extract with *Ghee* (purified butter), *Ginger (Zingiber officinale Roscoe)* and molasses (black treacle).

This practice was termed non-scientific as it makes breathing uncomfortable. Similar practice is not reported elsewhere.

This practice was appreciated by experts as it protect animal from cold weather. Similar practice is not reported elsewhere.

Similar practice is not reported elsewhere. However, the experts agreed for this practice as it helps to keep body temperature low.

Experts opinioned that this plant may be useful for throat & skin problems but not in reducing the fever. Wath & Jambu: villagers in Melghat of Maharashtra give *Piplo (Ficus religiosa)* leaves in fever.

According to experts this practice should not be followed as presence of thymol oil may make animal unconscious. Dudi & Meena: mentioned use of *Ajmo* seed in case of fever.

Mishra et al.: in Bundelkhand region mixture of Jaggery, *Ajmo* seed powder of *Fenugreek (Trigonella foenumgraecum)* seed, and *Ginger (Zingiber officinale)* is preferred treatment for fever.
<table>
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<tr>
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<tr>
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<td>Plant species with their family/local name/mode of administration</td>
<td>R</td>
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<td>IR</td>
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<td>Skin diseases (No. of response: 134)</td>
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<tr>
<td>10</td>
<td>*Massage with mixture of Haldar (Turmeric) &amp; Sarsav (Mustard) oil: About 1/2 tea spoon Haldar (Curcuma longa L.; Zingiberaceae) is mixed with lukewarm oil of Sarsav (Brassica napus L.; Brassicaceae) and gently massaged on the body (2 × 1) till cured.</td>
<td>31</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>11</td>
<td>*Applying Limdo (Neem) leaf paste: About two handful leaf of limdo (Azadirachta indica A. Juss; Meliaceae) are crushed together with little water &amp; prepared paste and used as an ointment on body parts (3 × 1) till cured.</td>
<td>51</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>12</td>
<td>*Applying mixture of Khopra oil (Coconut), Haldar (Turmeric) &amp; Salt: About 2 tea spoon Haldar (Curcuma longa L.; Zingiberaceae) &amp; 1 spoon of salt mixed in 250 g lukewarm Khopra (Cocos nucifera L.;Areceaceae) oil &amp; prepared concoction used as an ointment (3 × 1)on body parts till cured.</td>
<td>23</td>
<td>30</td>
<td>40</td>
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<tr>
<td>13</td>
<td>*Applying paste of root bark of Piplo (Pipal) and Dadam (Pomegranate) leaf with Tall (sesame) oil: The root bark powder (1 kg) of Piplo (Ficus religiosa L.; Moraceae) &amp; two handful chopped leaf of Dadam (Punica granatum L.; Punicaceae) are grinded with half cup of Tall (Sesamum indicum L.; Pedaliaceae) oil to make paste &amp; applied externally on affected (1 × 1) till cure.</td>
<td>29</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Removal of external parasites (No. of response: 195)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td>*Applying Khopra (Coconut) oil: Infected area is cleaned and Khopra (Cocos nucifera L.;Areceaceae) oil is applied externally (3 × 1) for treatment.</td>
<td>22</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>15</td>
<td>*Using boil salt water for giving bath: One bucket water with approximately 250 g salt boiled and allowed to cool down. This water is poured over the affected areas (2 × 1) at morning and evening till cure.</td>
<td>60</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>16</td>
<td>Simple hot water use for bathing: Animals are given bath with hot water regularly (1 × 1)</td>
<td>15</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>
Indigenous practices adopted by women for treatment of animal ailments

<table>
<thead>
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<tr>
<td>17</td>
<td>*Apply Limdo (Neem) leaf paste: About two handful fresh leaf of limdo (Azadirachta indica A. Juss; Meliaceae) are ground to paste &amp; applied (2 × 1) on affected parts.</td>
<td>74</td>
<td>R 70 PR 20 IR 10</td>
<td>According to experts, Limdo has antifungal properties &amp; also acts as repellent against ectoparasites. Gupta et al.26, Saha et al.31, Dudi &amp; Meena33, Bhanotra &amp; Gupta43, Borthakur &amp; Sharma44; documented use of Limdo leaf paste as ointment.</td>
</tr>
<tr>
<td>18</td>
<td>Fresh Tulsi (Basil) leaf juice is given: One handful fresh Tulsi ( Ocimum tenuiflorum L.; Lamiaceae) leaf are grinded well &amp; mixed with 2 glass of water &amp; given to cattle orally (1 × 1).</td>
<td>12</td>
<td>10 - 90</td>
<td>Experts did not support as it may cause allergic reactions. Jadaea et al.9; Porabandar farmers usually apply fresh leaf juice of Aloe vera.</td>
</tr>
<tr>
<td>19</td>
<td>* Apply Divela (Castor) oil: Divela (Ricinus communis L.; Euphorbiaceae) oil is applied externally (2 × 1) on the skin</td>
<td>12</td>
<td>10 70 20</td>
<td>Experts found that Divela oil is antiviral, antibacterial, antifungal &amp; act as a poultice. Nag et al.45; tribal of Udaipur apply SitaPhal (Annona squamosa L.).</td>
</tr>
</tbody>
</table>

Removal of internal parasites (No. of response: 182)

| 20    | *Mixture of Alisia (Linseed) oil & Divela (Castor) oil is given orally; About 100 ml of Alisia (Linum usitatissimum L.; Linaceae) oil and Divela (Ricinus communis L.; Euphorbiaceae) oil mixed together and administered orally (1 × 1)for 2-3 days. | 91 | 40 40 20 | Experts suggest that it possess antiviral, antimicrobial, antifungal & anthelmintic properties. According to Yadav et al.37 feeding Baval fruit for 4-5 days is helpful to kill the stomach worms. Mishra et al.41 mentioned two practices (i) decoction of Limdo leaf and (ii) root powder of Motha (Cypres rotundus L.) followed by Bundekhand farmers for cleaning internal parasites. Experts opined it to be wormicide and having laxative, anti-bacterial & anti-fungal properties. Sheikh & Parmar33; Farmers of Uttarakhand give Sarsav oil for deworming. |
| 21    | *Raw Sarsav (Mustard) oil is given orally: About 50-100 mL (based on severity) Sarsav (Brassica napus L.; Brassicaceae) oil fed orally (1×1). | 91 | 20 70 10 | - |

Foot & mouth diseases (No. of response: 161)

| 22    | *Jaggery (Goud) and Haldar (Turmeric) mixture: About 50 g Goud (prepared from Saccharum officinarum L.; Poaceae) mixed with one spoon of Haldar (Curcuma longa L; Zingiberaceae) powder to form paste with few drops of water & applied on infected hoof (2 × 1). | 48 | 60 40 - | Experts suggested that this combination may be useful in quick healing of wounds. Dudi & Meena33 and Mishra et al.41; agreed with healing power of Haldar powder and leaf extract of Limdo when applied externally over affected parts. |
| 23    | Billi (Wood Apple) fruit pulp: Approximately 500 g of Billi (Aegle marmelos (L.) Corrèa; Rutaceae) fruit pulp is boiled in plenty of water till it turned into paste. This paste was applied externally over affected parts (2 × 1) until cured. | 20 | 10 60 30 | Expert suggested it to be not effective. However, Jadaea et al.9 and Galav et al.24; supported use of pulp of Billi fruit to cure mouth disease. Bodapti & Chander46; advocated use of Peach (Purunus persica) leaf paste rather than Billi fruit pulp on lesions. This type of treatment practice is not reported previously and in this study experts opined it to be not effective. |
| 24    | Use of smoke: Some produced by burning excreta (dog) (2 × 1) | 36 | - - 100 | - |
| 25    | *Warm water treatment with Fhatkadi (Potash Alum): About 50 g Fhatkadiis dissolved in one liter of lukewarm water & used to wash infected hoofs. | 16 | 10 90 - | Experts agreed about antiseptic and antibacterial properties of Fhatkadi. Kanwar & Yadav36; Fhatkadiis antiseptic and consequently checks secondary infections. |
### Table 1 — Indigenous practices adopted by women for treatment of animal ailments (Cond.)

<table>
<thead>
<tr>
<th>S. N.</th>
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<tr>
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<td>Plant species with their family/local name/mode of administration</td>
<td>R</td>
<td>PR</td>
<td>IR</td>
</tr>
<tr>
<td>26</td>
<td>*Neem paste applied over infected body parts: About two handful leaves of Limdo (Azadirachta indica A.Juss; Meliaceae) is ground to form a paste &amp; smeared on the mouth &amp; foot (3 × 1) till cured.</td>
<td>41</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Tympany (No. of response: 195)</td>
<td>27</td>
<td>64</td>
<td>50</td>
</tr>
<tr>
<td>28</td>
<td>*Divela (Castor) oil is given orally &amp; smelled Kerosene: About one cup Divela (Ricinus communis L.; Euphorbiaceae) oil is mixed in ½ glass of water &amp; administered orally (2 × 1) in a day for two days. Besides, sick animal made to smell cloth dipped in kerosene (2 × 1).</td>
<td>75</td>
<td>30</td>
<td>60</td>
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<tr>
<td>29</td>
<td>Slurry of fresh Ajmo (Carom) seed, Ghee, Sugar: A slurry is prepared from one handful of fresh Ajmo (Trachyspermum ammi L.; Apiaceae) seed with two big spoon Ghee &amp; Sugar with slight water &amp; fed to cattle (3 × 1) for two days.</td>
<td>56</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>30</td>
<td>Diarrhoea (No. of response: 144)</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<tr>
<td>31</td>
<td>Feeding less or only dry fodder: Dry fodder are fed to cattle at empty stomach (3 × 1) for 3 days.</td>
<td>25</td>
<td>30</td>
<td>60</td>
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<tr>
<td></td>
<td>*Mixture of Variyali (Fennel) and Ajmo (Carom) seed: Equal mixture of Variyali (Foeniculum vulgare Mill; Apiaceae) &amp; Ajmo (Trachyspermum ammi (L.) Sprague; Apiaceae) are mixed together in a pot of water &amp; fed to the animal orally (2 × 1).</td>
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*(Cond.*)
Table 1 — Indigenous practices adopted by women for treatment of animal ailments (Cont.)

<table>
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<tr>
<th>S. N.</th>
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<tr>
<td></td>
<td></td>
<td>R  PR  IR</td>
<td></td>
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<tr>
<td>32</td>
<td>*Equal part of <em>Baval</em> (Babul) leaf with <em>Jeeru</em> (Cumin) seed: About two handfuls <em>Baval</em> (Acacia nilotica subsp. indica) (Benth.) Brenchan; Fabaceae) leaf. &amp; <em>Jeeru</em> (Cuminum cuminum; Apiceae) seed powder is added in the two cup of water &amp; ground to get decoction. This preparation is fed to animal orally (2 × 1) for 4 days.</td>
<td>44  10  90  -</td>
<td>Experts mentioned that presence of tannic &amp; gallic acid in Babul leaf helpful in digestion. Yadav et al.3: tender Babul twigs are given as feed stuff or 2-3 days for curing Diarrhea in Tosham area.</td>
</tr>
<tr>
<td>33</td>
<td>*Give unripe (<em>Billi</em>)Wood Apple fruit mixed with water: Stuff of two big unripe [*Billi, Aegle marmelos (L.) Corrêa; Rutaceae] fruit mixed and macerated in water and given orally (3 × 1) till cure.</td>
<td>10  40  60  -</td>
<td>Experts found it to be effective due to its antiviral, anti-inflammatory, digestive and carminative properties. Balaji &amp; Chakravarthi9 endorsed fruit pulp extract of <em>Aegle marmelos</em> L. Corrêa (<em>Billi</em>) with Mango kernel.</td>
</tr>
<tr>
<td>34</td>
<td>*Unripe <em>Chikoo (Sapota)</em> with Salt is given: Stuff of two unripe <em>Chikoo</em> (Manilkara zapota (L.) P. Royen; Sapoteaee) with little salt is effectively mashed &amp; ground with enough water to make in paste form. This is given orally to animal (2 × 1) for 2 days.</td>
<td>18  30  40  30</td>
<td>Anti-diarrheal properties of <em>Chikoo</em> is accepted by specialists. Bodapiti &amp; Chander46: Local of Uttarakhand use unripe <em>Billi</em> fruit &amp; <em>Chikoo</em> with Salt.</td>
</tr>
<tr>
<td>35</td>
<td>Feeding Castor (<em>Divela</em>) oil, edible Soda &amp; water: Small cup of <em>Divela</em> (Ricinus communis L.; Euphorbiaceae) oil &amp; edible soda (Sodium bicarbonate) mix with 1 jug of water &amp; given orally (2 × 1) for three days.</td>
<td>14  30  10  50</td>
<td>According to experts use of Castor and Soda aggravates the Diarrhea, therefore, should not be given. While Kanwar &amp; Yadav36 and Sheikh &amp; Parmar10, documented practice of giving edible soda with water &amp; <em>Divela</em> oil to cure Diarrhea.</td>
</tr>
</tbody>
</table>

Indigestion (No. of response: 170)

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Indigeneous practices with their family/local name/mode of administration</th>
<th>F Expert’s opinion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>*Mixture of <em>Ajmo (Carom), Alsia (Linseeds)</em> oil &amp; water: About two handful <em>Ajmo</em> (Trachyspermum ammi (L.) Sprague; Apiceae) seed crushed and mixed with equal quantity of <em>Alsia</em> (Linum usitatissimum L.; Linaceae) &amp; water. This mixture is filtered and extract is fed orally (2 × 1) for animal for 2-3 days.</td>
<td>30  60  30  10</td>
</tr>
<tr>
<td>37</td>
<td>*Mixture of *Halder (Turmeric), Hing (Asafetida) and Salt: About 30 g <em>Halder</em> (Curcuma longa L.; Zingiberaceae) are mixed in water with pinch of <em>Ferula assafoetida</em> L.; Apiceae (hing) &amp; one spoon salt and administered orally (2 × 1) to the animals.</td>
<td>39  60  30  10</td>
</tr>
<tr>
<td>38</td>
<td>*Feeding mixture of Fenugreek (Methi), Fennel (Variyali) &amp; Carom (Ajmo): Equal amount of powdered mixture of <em>Methi</em> (Trigonella foenum-graecum L.; Fabaceae), <em>Variyali</em> (Foeniculum vulgare Mill; Umbellifereae) &amp; <em>Trachyspermum ammi</em> L.; Apiceae (<em>Ajmo</em>)seed are given (2 × 1) in case of indigestion.</td>
<td>42  50  40  10</td>
</tr>
<tr>
<td>39</td>
<td>*Feeding boiled Dill (<em>Stva</em>): Two spoon of crushed seed of <em>Anethum graveolens</em> L.; Apiaceae (<em>stva</em>) boiled in one cup of water and let steep for 10 min &amp; strain. Prepare decoction administer orally to animal (3 × 1) till cure.</td>
<td>22  30  60  10</td>
</tr>
</tbody>
</table>
leaves juice with butter milk and castor oil is administered to cure constipation. Followed by seed of *Trachyspermum ammi* Sprague, is reported earlier in flatulence\(^{11,12,13}\) and stomach pain\(^{12}\) while enumerated in present study for treatment of diarrhea along with tympany and indigestion. Corollary oil of *Ricinus communis* was reported previously in fever\(^{9,12}\), cold\(^{9}\) and diarrhea\(^{10}\), whereas in present study maximum use of this plant species is in treatment of constipation, removal of external parasite, removal of internal parasite and tympany. Seeds of *Trigonella foenumgraecum* for rheumatism\(^{9,12}\) and increase lactation\(^{8}\) and fruit of *Ficus religiosa* was used in conception reported formerly but in present study *Trigonella foenum-graecum* in indigestion and bark of *Ficus religiosa* is applied to cure skin disease. In contrary to using oil, use of pericarp ash\(^{12}\) of *Cocos nucifera* reported to cure skin disease.

In this region, seeds as ingredient was frequently used in (19 applications), followed by leaves (9 applications). This is in contrast to some previous studies\(^{14-18}\) where plant leaves were commonly used; in this study seeds (44 %) were found to be the most frequently used plant parts in ethno-veterinary preparation. Overall, these two plant parts constitute more than 60 % of the total parts used in terms of total applications. Similarly, rhizome and stem each used in 4 applications followed by fruits (3 applications). The root bark used in only application. Including seeds, leaves, root barks total seven plant parts used for preparations of remedies, which is supported by several other studies\(^{19-23}\). In terms of total number of applications, the most preferred form of drug was combination used in 9 applications. Other preferred forms of drugs formula was oil and paste used in 7 applications each. Decoction was used in 4

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**Table 1 — Indigenous practices adopted by women for treatment of animal ailments (Cond.)**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Indigenous practices</th>
<th>Plant species with their family/local name/mode of administration</th>
<th>F</th>
<th>Expert’s opinion (%)</th>
<th>Relevant reference/ information</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td><em>Feeding Mustard cake:</em> One part of <em>Brassica napus</em> L. Brassicaceae (<em>sarsav</em>) seed is soaked overnight in water and cooked with half part of <em>Goud</em> (<em>Saccharum officinarum</em> L.; Poaceae.) &amp; one tea spoon black salt. Thus prepared mustard cake is given to animal (2 × 1) for two to three days.</td>
<td>24</td>
<td>10</td>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>41</td>
<td><em>Salt water is given:</em> (2 × 1)</td>
<td>13</td>
<td>10</td>
<td>60</td>
<td>30</td>
</tr>
</tbody>
</table>

**Constipation** (No. of response: 171)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Indigenous practices</th>
<th>Plant species with their family/local name/mode of administration</th>
<th>F</th>
<th>Expert’s opinion (%)</th>
<th>Relevant reference/ information</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>*Feeding crushed leaf of <em>Sitaphal</em> (Custard Apple), Butter milk and <em>Divela</em> (Castor) oil: About 200 g leaf of <em>Sitaphal</em> (<em>Annona squamosa</em> L.; Annonaceae) are crushed and mixed with equal amount of Chach (buttermilk) &amp; <em>Divela</em> (<em>Ricinus communis</em> L.; Euphorbiaceae) oil is given orally (2 × 1).</td>
<td>97</td>
<td>40</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>43</td>
<td>Green fodder and grinded <em>Mung</em> (Green Gram) is given: Approximately 200 g grinded <em>Mung</em> (<em>Vigina radiate</em> L.R.Wilczek; Leguminosae) is fed (3 × 1) to the cattle along with green fodder.</td>
<td>74</td>
<td>30</td>
<td>60</td>
<td>10</td>
</tr>
</tbody>
</table>
applications, followed by slurry, water treatment, smoke and juice, etc. Regarding mode of application, oral administration (56 %) is closely followed by external application (44 %) methods.

**New Findings**

This study reports 13 different plant species and common salt used to in 11 new treatment methods. This list includes, *Acacia nilotica* leaves decoction for treating fever; bark root of *Ficus religiosa* with *Punica granatum* for curing skin disease; *Ocimum tenuiflorum* leaves extract, oil of *Ricinus communis* seeds and oil of *Cocos nucifera* for removal of external parasite; oil of *Linum usitatissimum* seeds for removal of internal parasites; seed powder of *Cuminum cyminum* for treating diarrhea; *Curcuma longa* with *Ferula assafoetida*, *Trigonella foenum-graecum* seeds and *Anethum graveolens* seeds to treat indigestion and *Vigna radiate* beans to cure constipation.

Use of 13 species recorded during the present study have been already reported in previously published relevant literatures for treating other livestock disease from India; i.e., *Acacia nilotica* commonly used to increase lactation, jaundice and removal of placenta, to treat fractured bones, mastitis, prolapsed uterus, wounds and sun stroke, *Ficus religiosa* in conception and haemorrhoids, wound, tonsils, haematuria and indigestion, *Punica granatum* in liver problem and haemorrhoids; *Curcuma longa* in internal injury, flatulence, removal of internal parasite and FMD, estrus regulation and inflammation, *Ficus religiosa* in conception and haemorrhoids, removal of internal parasite, bloat and wound; *Trigonella foenum-graecum* in reumatism, increase lactation, diarrhea and fever, bloat and easy delivery, mastitis, removal of placenta and diptheria and pneumonia, *Anethum graveolens* in cattle pregnancy and *Vigna radiate* in cough & cold. Same uses of these species in other parts of the country, validate their use in the study area.

**Scientific evaluation**

Out of total 43 practices in paper 30 practices were termed as relevant by experts while remaining 13 practices are followed without any scientific basis or might be altered due to various reasons. All indigenous practices followed by women for treating skin disease, removal of internal parasite and indigestion were favored by experts while three out of 4 practices in treating fever is not approved. Followed by two out of 5 traditional methods to recover cold & FMD and two out of 6 traditional practices used to cure removal of external parasite and diarrhea were not preferable by experts. However, one out of 3 ethnoveterinary method used for treatment of tympany and one out of 2 treating methods in constipation were not considered by judges.

**Conclusion**

Total 43 practices followed by rural women of Dantiwada taluka of Banaskantha district of Gujarat state were documented for scientific evaluation in the present study. However, experts termed only 30 practices relevant or effective. The affordable cost and almost no side effects of these traditional preparations with common ingredients make them adaptable by the local community. Many of the ingredients employed by women were very commonly found in household and widely used to cure ailments. The respondents administer the indigenous remedies to the animals mostly orally as decoction, or through fumigation or external application. It is observed that method of preparation and dose of the remedies were uncommon, as women did not have proper idea about amount, frequency and duration of dosages. It is mostly believed that dose is depends on severity of disease and availability of ingredients/ plants used for treatment. Therefore, well planned experimental and clinical evaluation of these practices is inevitable for proper scientific validation along with authentic record and proper documentation. Standard specification must be developed for indigenous practices by indicating the ingredients, amount of the range of active principle, their therapeutic properties, etc., in varied condition, environment and culture appropriateness. There is an urgent need of the amalgamation of the modern veterinary medicine, modern science and ethnoveterinary practices so as to derive synergy in animal healthcare. The traditional medicine can be a real source for insights for the discovery of new medicinal compounds. The revitalization of these indigenous systems can provide self-reliance in primary healthcare and can even contribute to the frontier of veterinary system of medicines while meeting the expectation and need of clientele too.

**Acknowledgement**

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